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ABSTRACT

This report opens with a review of how two structured interview protocols that identify the nature and scope of children's science-related activities outside of school were developed. The interview procedures are known as Community and Home Activities Related To Technology and Science (CHARTS) with the preschool version known as CHARTS/PS and CHARTS/SA for school age children. Foundational research has prompted revision of the preschool version involving questions about a wider range of activities. The purpose of this report is to make the modified preschool version of the interview available to researchers with similar interests. A discussion of the original interview, major modifications made to it, and suggestions on how to modify the procedures for different research purposes are included. Contains 14 references. The survey instrument and the interview are appended. (DDR)

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CHARTS: A TOOL FOR SURVEYING YOUNG CHILDREN'S OPPORTUNITIES TO LEARN ABOUT SCIENCE OUTSIDE OF SCHOOL

ED 417 952

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CHARTS: A Tool for Surveying Young Children's Opportunities to Learn about Science Outside of School

Science learning occurs in many settings before children enter school and long after they have grown and completed their formal education. For example, in North America, young children are exposed to science on television, through books read to them by their parents, or through home demonstrations and experiments. Young children may also learn about science in community programs held at special facilities or by attending museums, through adults who work in fields related to science or its applications, and, increasingly, through computer-related opportunities. Collectively, these experiences are often called "informal learning" by educators, referring to activities that are "nonsequential, self-pacing, nonassessed, and often involving groups" (Dierking & Martin, 1997, p. 629). Such experiences frequently involve dialogues between parent and child. They can be motivated by the personal interests of parent, child, or mutual interest.

Studying these learning opportunities provides insights into the scientific concepts and modes of thought introduced to children incidently in the course of family routines. Examples of these routines include the nightly book reading used by many parents to settle children before bed or the trips parents take to museums to allow their children to let off steam on a cold or rainy day. This research can also provide insights into the learning of children who enter school already expert in their knowledge of topics such as space travel and the latest theories about the extinction of the dinosaurs. Such research can help us document the nature and sources of public conceptions and misconceptions about the science and scientists. Most importantly, knowledge about informal learning and children's developing conceptions about science and scientists can

become a platform on which teachers can build in the classroom.

In response to the growing interest in research on informal learning in science, a recent issue of *Science Education* was devoted to this topic (Dierking & Martin, 1997). The majority of work in informal science is conducted in cultural institutions devoted to instruction such as museums and science centres (Dierking & Falk, 1994). Our work, however, is focussed on another important cultural institution, the home. Our specific interests are in the ways in which children are exposed to, or expose their parents to, science in the course of everyday life both at home and in their communities. Research designed to identify the nature and scope of children's science-related activities outside of school is an important but under-represented aspect of this new enterprise. The focus of our efforts have been on the development of structured interviews that would serve this purpose.

In an article in the special issue of *Science Education*, (Korpan, Bisanz, Bisanz, Boehme, & Lynch, 1997), we described how we developed two structured interview procedures: Community and Home Activities Related to Technology and Science (CHARTS) for parents of preschool children (CHARTS/PS) and for school-age children (CHARTS/SA). We also related the kind of information these interview procedures enabled us to obtain and the lessons we learned in collecting preliminary data. One important lesson was that interpretation of some of the responses from the interviews would have been enhanced if we had obtained information about the frequencies of a wider range of activities than we did. For example, although we asked how often children watched television programs related to science, we did not ask how much children watch television in total. Consequently, we could not always determine the *relative frequency* of science-related activities. Relative frequency might serve as a good index of interest

in science. For a similar reason, we did not ask about the frequency of some activities (e.g., home experiments) that we expected, a priori, to occur quite rarely. We were surprised to find our expectations violated. Another lesson was the importance of asking parents what causes them to engage in science-related activities.

Other general lessons resulted from adapting the interview procedure to the needs of specific types of participants. For example, because CHARTS/PS was used to interview parents, the purpose of the interview was quite overt and the style was one of open-ended questions suitable for initiating discussion of a topic and eliciting salient responses from adults. In contrast, CHARTS/SA was designed for interviewing school-age children (see Korpan et al., 1997) and involved a greater reliance on the presentation of comprehensive lists to cue children's memories. This stylistic change was made to compensate for the difficulty children often have with memory recall compared to recognition or cued recall (e.g., Kail, 1990). It seemed likely, however, that a list-oriented approach might enable respondents, even adults, to think about a greater range of activities, and thus enable them to provide a broader range of responses. With hindsight, a procedure representing a combination of both approaches seemed most appropriate. Finally, while both interview procedures were designed to optimize the amount information obtained about science-related activities, some adaptations were made to the style and content of CHARTS/SA in order to engage and sustain the attention of children for whom science was not a primary interest. Again, with hindsight, such adaptations seemed appropriate for sustaining the interest of the parents of such children as well. Parents can become disheartened if all or most of their responses during an interview about their children are of the "no" or "none of the time" variety.

As a result of this foundational work, we modified the original preschool interview. The purpose of this report is to make the modified CHARTS/PS interview (see Appendix) available to researchers with related interests. In the next few sections, we describe the original interview, the major modifications we have made to it and, finally, our suggestions about how customize the modified procedure for different research purposes, cohort groups, and locales.

The Original Interview

The original CHARTS interview began with a preamble about what scientists do and what technology means. These preliminaries were considered essential for encouraging parents to think broadly about the nature of science and technology. To encourage parents to provide detailed responses, we described the value of information about home and community activities for developing educational programs that complement preschool learning. In the seven major sections that followed, we presented questions designed to gather information about opportunities to learn about science and technology in a broad range of family and community activities. The order of these sections was selected to establish rapport with the parents and to build their confidence. For example, questions about television were asked early because television watching is common and we assumed that most parents would provide an affirmative response.

The first section, About Your Child, was designed to obtain information about the child and family (e.g., the child's age, sex, and number of siblings). Researchers conducting studies on children's interest in school science activities have found effects of sex and age (e.g., Erickson & Erickson, 1984). Questions of this type were included to enable us to determine whether involvement in home and community activities are similarly related to these factors.

The next five sections were designed to determine the range and frequency of science-

related activities in which young children participate. The second section, Watching Television, consisted of questions about the amounts and types of programs that children watched. We asked questions about children's favorite television programs, the frequency with which various types of science programs (e.g., Nature of Things, National Geographic, Star Trek) were watched, and the frequency with which parents discussed these programs with their children.

The third section, Adult/Child Reading Activities, pertained to questions about favorite books, how frequently someone read to the child, and the proportion of time spent on reading materials related to science, nature, or technology. These questions were included to enable comparisons with the data on emergent literacy in reading and writing (e.g., Sulzby, 1978). The fourth section was on Science Activities in the Home, including questions on working with electronic equipment (computers and calculators), nature-related activities (pets and gardening), hobbies and toys, and careful observations or simple experiments at home. The fifth section, Community Outreach Programs, was motivated by the literature on informal science learning in museum settings (e.g., Dierking & Falk, 1994), but the focus of our questions was again one of sampling a broad range of opportunities in our community (14 in total). We asked about opportunities ranging from the most obvious (e.g., the city's space and sciences centre) to those about which parents would be aware only if they or their children had a keen interest (e.g., science reading programs at a library, engineering camps). These questions provided information, potentially useful to teachers and researchers, about the extent to which children are exposed to informal but structured learning situations designed to enhance learning and promote interest in science.

The sixth section, Answering Questions about Science and Technology, was motivated by

the literature on language and conversational skills (e.g., Schmidt & Paris, 1984). We inquired about the types of questions children ask about science, nature, and technology, the sorts of activities that inspire question asking, the question-answering techniques parents use, and parents' comfort level in answering questions. These items reveal the types of situations that inspire children to ask questions and the topics that cause them to engage in sustained thinking. Teachers also can gain knowledge about the information-gathering techniques children have observed and perhaps some idea about the quality of answers to which children have become accustomed. The final section, About Your Household, was designed to gather information about the interests of both parents and children, parents' educational backgrounds, the availability of role models with science-related careers, and familial support for science-related career choices.

The general format for the interview was to begin by asking Yes/No questions, designed to determine whether or not an activity occurred at all (e.g., "In the past year, did anyone in your household help Ian conduct simple science experiments or engage in careful observations that were intended to help her understand the way the world works?"). Affirmative responses were followed with requests for an example. For activities we expected to occur frequently, we proceeded to ask how frequently the activity occurred and provided an opportunity for parents to give examples (e.g., "Roughly, how many times per week, per month, or per year does someone in your household read to Ian? How often would you estimate that the reading involves topics related to science, nature or technology? Please give an example of a topic.").

Lists of activities were also presented (e.g., "Please indicate if Ian has visited or attended any of the following things in the past year"). In such cases, the lists were designed to be comprehensive, but parents always were encouraged to comment on any relevant activity not

included on the lists. These lists had two additional properties. First, some items were designed specifically for older children and adults (e.g., questions about encyclopedia articles, science fiction, science textbooks, and both general interest and science magazines), whereas others were designed specifically for younger children (e.g., educational series, such as World Book's Childcraft series, and science magazines for young children). This wide spectrum provided an opportunity for comparisons with responses of older children. Second, the questionnaire was structured so that any regionally appropriate items (e.g., science programs on major Canadian and U.S. networks, and the local nature center, science center, museum, and conservatory) could be substituted in the lists by other investigators. Finally, multiple-choice questions, supplemented by requests for an example, were also used to fully explore some topics (e.g., "How often were the questions Ian asked in the past year related to science, nature, and technology?", with answer options such as "most of the time, some of the time, rarely, none of the time").

Modifications

Major modifications were made to the interview with respect to collecting information about the breadth, frequency, reasons for, and currency of activities. With regard to *breadth*, the whole interview was modified to sustain the interest of parents whose children may not have a great interest in science, nature, and technology. In the preamble, parents were told that, although the focus of the interview was on science, nature, and technology, we wished to characterize childrens' interests in a broad range of activities in the home and the community. In addition, at the beginning of the interview, an entire section, Interest in Activities Outside of School, was added. In this section, parents were asked to rate their child's interest in a variety of activities popular with children. Furthermore, in three sections, Watching Television, Adult/Child

Book Reading, Community Activities, parents were asked to rate their child's interests in both science- related and science-unrelated activities. Non-science items were also added to the lists of activities in these three sections (e.g., in Watching Television, *Hockey Night in Canada*, in Book Reading, horror books, and in Community Activities, swimming). Finally, for most sections, open-ended questions were added about children's favorite activity (e.g., favorite book, favorite TV program, favorite activity on the computer), allowing parents to specify either science-related or science related activities. In the original interview, it was difficult to determine whether the child who showed a strong interest in science had a singular passion or whether the child also had strong interests in other activities. These changes will enable researchers to address this issue.

With regard to *frequency*, parents were asked how often their children engage in each major type of activity generally (e.g., "Approximately how many hours per day, week, month, or year does your child watch TV?") and specifically with regard to science, nature, and technology (e.g., "Approximately how many hours per day, week, month, or year does your child watch television programs related to science, nature, and technology?"). In the original interview, we omitted questions of this type in the interest of constructing interviews of reasonable length, but, as noted earlier, this economy had consequences. Sometimes it was difficult to fully characterize the extent to which children engaged in science-related activities because we did not also establish how frequently they engaged in similar activities that were not science-related. Again, this information allows researchers to determine children's interest in science relative to other topics. These changes also enable researchers to collect frequency information for activities we expected, mistakenly, to occur rarely (e.g., home experiments). Rather than make assumptions about what

is typical in families, as noted earlier, our experience taught us it is better to collect comprehensive frequency data from parents. A profile of frequent and rare activities can be constructed from the data.

With respect to the *reasons* for activities, questions were added to sections that should enable investigators to determine why science-related activities occur at all (e.g., "Did your child request this activity, or was it someone else's idea?" "What caused you (or someone else) to engage in these activities?") These questions should provide an opportunity for researchers to better characterize the motivational patterns of different families and the extent to which informal learning in science is intentional or incidental feature of family life. In some cases, children express an interest in science-related activities In other cases, parents may choose to get their children involved for recreational or educational purposes.

With regard to *currency*, some changes simply involved updating the interview to reflect the availability of new programming and cable television channels devoted totally to science as well as growing use of the Internet in homes. In an climate of rapid technological change and distribution of new technologies, the need to make such modifications of this type may occur with some regularity. To economize, we also deleted the section about calculators. Although most children in our samples had access to calculators, they seemed to show little interest in them. Perhaps the novelty of calculators has diminished or perhaps they are not interesting compared to computers.

Customization

We have attempted to construct an interview procedure tailored for use in our community yet with an overall structure that will have widespread utility, at least for researchers working in

the developed world. Use of the procedure by other investigators will necessarily require, however, customization to fit the time, locale and purposes of the study. Educational and societal trends and our knowledge of children's development certainly change over time, and interests in various types of activities will wax and wane as a result. The user will find it necessary to modify the contents of the interview to reflect these changes. In addition, for the shift to a greater reliance on the use of structured lists to be effective, items on our lists (e.g., programs offered at the Edmonton Space and Sciences Centre in the section on Community Activities) must be replaced with items resulting from a detailed knowledge about the community in which the participants live. This tailoring may require preliminary interviews with parents whose children have a passion for science.

The interview is quite long, and not all questions included in the interview may be of equal interest to all users. Obviously, questions can be omitted or added to fit the particular needs of the user. Finally, wording of the preamble and questions may be modified to fit the needs of specific parent populations. For example, some parents prefer to read the preamble. Other parents may not be fluent readers and it may be best for the interviewer read the preamble to them. In the latter case, the preamble should be changed so that it is more conversational and less overwhelming.

Conclusion

The study of informal learning in science is in its infancy. Its promise can be seen, by analogy, through considering the effects that research on "emergent litaracy" has had on elementary school practice and educational rhetoric in the language arts. For nearly two decades, researchers studying emergent literacy have documented the naive or emerging theories of reading

and writing that young children generate before they enter school (e.g., Bissex, 1980; Ninio & Bruner, 1978). A variety of methods have been used to gather information about emergent literacy, ranging from structured interviews (e.g., Ferreiro, 1978) to ethnographic work (e.g., Heath, 1980). Findings from the intensive study of children's informal learning and home environments have become a force that has undermined traditional concepts of "reading readiness", highlighted the active and constructive nature of children's learning, and encouraged teachers to consider the importance of home-school partnerships for helping children learn to read. The result has been a paradigmatic shift in how classroom teachers and curriculum planners think about and teach language arts in the primary grades (Teale & Sulzby, 1986). Attainable also, given the current research base, is the adaption of reading instruction to the learning styles of individual children (e.g., Armstrong, 1994; Gardner, 1991). Considering the great potential for curricular enrichment evident in this analogy, developmental psychologists and science educators would do well to ask, "Why not in science education?" Collectively, we need to nurture and encourage the research on young children's informal learning in science that, in the motivational words of Jean-Luc Picard, will "Make it so."

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Appendix

COMMUNITY AND HOME ACTIVITIES RELATED TO TECHNOLOGY & SCIENCE: PRESCHOOL SURVEY (CHARTS-PS)

Note that italicized text is included only in the interviewer's copy. Parents are given a copy of the survey that does not contain italicized text. Instructional prompts for the interviewer are italicized and bolded. Italicized questions preceded by * are conditional follow-up questions that are asked only when parents provide an affirmative response to the immediately preceding question.

PREAMBLE TO INTERVIEW

This interview will take about 1 hour to complete. I would like to emphasize that your responses are confidential. Identifying information such as your name or phone number will not be recorded with your responses. Also, your participation is voluntary. Therefore you may decline answering any question and you may end this interview at any time.

I would also like to prepare you for how we will proceed with this interview. I will read the questions aloud. I am providing you with a copy of the interview to help you follow along. Your responses will be tape recorded, so you may respond at a pace that is comfortable for you. Also, you may elaborate your responses as fully as you wish.

In some cases, I will ask you how often your child and members of your household participate in various activities per day, per week, per month, or per year. You can provide only rough estimates; we do not expect you to provide exact numbers. In other cases I will present you with lists of activities. Our aim was to make these lists as comprehensive as possible. We do not expect members of a household to participate in all these activities. Finally, parents engage in various activities with their children for many possible reasons. I will ask questions about why and how these activities are initiated in your household.

The next page describes our research and provides details about the content of this interview. I will read this description and then we will proceed with the interview.

The interviewer will read aloud the following text.

The purpose of this survey is to ask you about activities in the home and community. Our primary interest is in activities that are related to science, nature, and technology. We will also ask about other activities that contribute to a broader picture about the lives of children. This information may help educators design programs that more effectively integrate home and school learning. Your participation is voluntary and all your responses are confidential. You may indicate that you do not want to answer any specific questions or indicate that you wish to end the interview at any time. Feel free to make comments at any time.

What are Science and Technology?

Scientists study many things. Some scientists try to understand the origins of the universe while others try to understand human behavior. Still other scientists study the life cycles of plants and animals or how chemical emissions contribute to pollution. In other words, scientists want to know how the world works. Technology involves putting scientific discoveries to use.

You don't have to be a professional scientist to be interested in how the world works. People of all ages can learn about science, nature, and technology by participating in many different types of activities. For example, by reading books about cars, you can learn about why and how cars work. A television program on stars can inform viewers about theories of the universe. While going on walks and observing the surroundings, you can learn something about plant and animal nature. People can also learn about science, nature, and technology by participating in other activities, such as conducting simple experiments at home, visiting museums, and so on.

What is the Task for Teachers?

Knowledge about science is becoming increasingly essential in our rapidly changing society. Educators are faced with the task of teaching children enough about science, nature and technology to prepare them for making informed decisions as adults about issues such as environmental pollution or medical treatments. Teachers are also responsible for preparing some children for careers in science.

What Research is Needed?

Educators may be most effective when they develop programs that complement the preschool learning activities that occur in the home or in the community. Once children enter school, close partnerships with care givers must be developed and maintained for children to achieve their greatest potential. Unfortunately little is known about activities that may occur in home or in the community that may relate to the science curriculum.

The Survey

In this survey, I will ask you questions about your child and members of your household. Next I will ask you about activities that may have occurred in the last year. In particular, I will ask you about activities that may have occurred in your home and in the community and that may be related to what your child learns about science, nature and technology. These activities include watching television, reading, working with electronic equipment, gardening, caring for pets, visits to community facilities or participation in programs. This information may be used by educators to design science programs that effectively integrate home, community, and school activities. This interview will take about 45 minutes to an hour to complete.

Are you ready to continue?

If YES, continue on to page 4 and say "Now we will go on to the next page."

Section I: About Your Child

First I would like to ask you a few questions about your child.

1. How old is your child (years, months)?

2. Is your child a boy or girl? B G

The next section is about your child's interests.

Section II: Interest in Activities Outside of School

1. There are many different things that capture the interest of children. I am going to read you a list of general activities. I want you to use the following scale to rate how much interest your child has in the activities listed below.

    a. very interested
    b. somewhat interested
    c. neither interested or uninterested
    d. somewhat uninterested
    e. very uninterested

    How interested is your child in:

    -sports_____
    -music_____
    -make-believe play_____
    -math (e.g., counting)_____
    -reading_____
    -art/drawing_____
    -playing with toys_____
    -science, nature, and technology_____
    -cooking_____
    -writing_____
    -using computers_____
    -video games_____
    -watching television_____
    -caring or playing with pets_____
    -gardening_____

2. Are there any interests that I may have missed? (Y / N) ***If YES, ask the following 2 questions:***

    **What are they?*

    ***For each activity, ask** How interested in your child in this activity?*

Section III: Watching Television

1. Does your child watch TV outside of school? (Y / N) ***If NO, go to Section IV, If YES, ask the following question:***

   **Where?*

2. Children often have a favorite TV program. A favorite TV program is one that they look forward to watching and try not to miss. Over the past year, has your child had a favorite TV program? (Y / N) ***If YES, ask the following 2 question:***

   **Which program?*

   **What is the program about?*

3. Children may enjoy watching many types of television programs. I will read a list of different types of programs. Please rate your child's interest in each type of program, including cartoons, using the following scale:

   a. very interested
   b. somewhat interested
   c. neither interested or uninterested
   d. somewhat uninterested
   e. very uninterested

   How interested is your child in television programs that focus on:

   -sports_____
   -comedies_____
   -action/adventure_____
   -science/nature_____
   -development of prosocial skills, as on Barney_____
   -dramas_____
   -science-fiction_____
   -development of school-related skills such as reading and counting as on Sesame Street_____
   -gardening/home repairs_____

   Is there any type of program that I may have missed? (Y / N) ***If YES, ask the following 2 questions:***

   * *What are they?*

   ***For each type of program ask**, *How interested is your child in these programs?*

4. I will read to you a list of TV shows that your child may have watched over the past year. Please indicate whether or not they have watched each show. If YES, please estimate how many hours per day, week, month, or year they watched these shows, using the unit of time that is most convenient for you.

In the past year, has your child watched:
Remember to record the # of hours where applicable

Star Trek_____
Seaquest _____
Mr. Science_____
Hockey Night in Canada_____
Kingdoms of Survival_____
Science Frontiers_____
Wild Kingdom_____
Teenage Mutant Ninja Turtles_____
Science Alive_____
Nature Walk_____
What on Earth?_____
X-Files_____
Family Matters_____

Beyond 2000_____
Bird Guy_____
Jack Hanna's Animal Adventure_____
Untamed World_____
Bill Nye the Science Guy_____
National Geographic_____
Simpsons_____
Gardening Shows_____
Acorn the Nature Nut_____
3-2-1 Contact_____
Earth: Final Conflict_____
Step by Step_____
Magic School Bus_____

Are there any TV shows related to science, nature, and technology that your child watched that I may have missed? (Y / N) ***If YES, ask the following 2 questions:***

**What are they?*

***For each program, ask** How many hours did your child watch this program per day, week, month, or year?*

5. Over the past year, approximately how many hours per day, week, month, or year did your child watch TV?

6. Approximately, how many hours per day, week, month, or year did your child watch television programs related to science, nature or technology?

Sometimes children watch TV alone, or with an adult. Now, I will ask you about watching TV with adults.

7. Has an adult watched any science-related programs with your child over the past year? (Y / N)
If NO, go to question 10. If YES, ask the following 2 questions:

**Which programs?*

****For each program they co-watch, ask** *Approximately how many hours per day, week, month, or year did an adult watch science-related programs with your child?*

8. Did an adult ever discuss the science content of these programs with your child? (Y / N) ***If NO, go to question 10. If YES, say:***

**Please give an example of a discussion:*

9. Who initiated these discussions?

10. Has your child watched any of the following TV channels?

Discovery Channel
The Learning Channel
YTV
Access

If YES for The Discovery Channel, The Learning Channel, or Access, ask the following 2 questions

**What shows did your child watch on that channel?*

****For each science show, ask** How many hours per day, week, month, or year did your child watch?*

The next section concerns reading activities.

Section IV: Adult/Child Reading Activities

1. Over the past year, has someone read to your child outside of school? (Y / N) ***If NO, go to Section V, if YES, ask the following question:***

   Who?* ***Record the relationship of the readers to the child.*

2. Children often have a favorite book. A favorite book is one that they ask to have read to them repeatedly, or they look at it repeatedly themselves. In the past year, has your child had a favorite book? (Y / N) ***If YES, ask the following question:***

   **What was the title or topic?*

3. Children may enjoy many types of reading materials. I will read a list of different types of reading materials. Please rate your child's interest in each type of material using the following scale:

   a. very interested
   b. somewhat interested
   c. neither interested or uninterested
   d. somewhat uninterested
   e. very uninterested

   How interested is your child in reading materials that focus on:

   -sports_____
   -adventure tales_____
   -science, nature, or technology_____
   -science fiction_____
   -religious stories_____
   -fairy-tales, folk tales, myths & legends_____
   -scarey books_____
   -mysteries_____
   -cooking, arts, crafts, games & activities_____

   Are there any types of reading material that I may have missed? (Y / N) ***If YES, ask the following 2 questions:***

   **What are they?*

   ****For each material, ask**: How interested is your child in this material?*

4. I will read a list of materials that may or may not have been read with your child over the <u>past year</u>. Please indicate whether or not someone has read each material with your child. If YES, please estimate the average number of <u>times</u> per day, week, month, or year someone has read the following materials with your child.

I will begin by presenting a list of materials for adults. ***Remember to record # of times where applicable.***

Has someone read with your child:

-encyclopedias articles related to science, nature, and technology_____
-a science series (like the Time-Life Books)_____
-biographies_____
-individual books for adults containing themes related to science, nature or technology_____
-science fiction novels_____
-history books_____
-science textbooks_____
-science magazines for adults such as Canadian Geographic, Discovery, Omni_____
-general magazines such as MacLean's and Time_____
-newspapers articles related to science, nature and technology_____

The following are children's reading materials

Has someone read with your child:

-educational books, such as the Childcraft series produced by Worldbook, particularly articles related to science, nature, technology_____
-children's storybooks with themes related to science, nature, or technology_____
emphasize that we are interested in fiction
-fairytale books_____
-children's nonfiction books with information on a topic or topics related to science, nature or technology_____
-science magazines for children such as Owl, Chickadee, 3-2-1 Contact, Ranger Rick, World_____
-comic books_____
-general magazines for children that may feature articles with themes related to science, nature and technology, such as Sesame Street_____
-children's scary books, such as Goosebumps_____

Are there any other materials with themes about science, nature and technology that someone has read with your child that I failed to mention? (Y / N) ***If YES, ask the following 2 questions:***

**What are they?*

***For each material, ask** How many times per day, week, month, or year has someone read this to your child?*

5. Roughly, how many times per day, week, per month, or per year has someone in your household read to your child?
6. Approximately how long did each reading session last, on average?

7. You specified in question 5 that you/someone read _____times per _____to your child. Of the _____times per _____, how often do you think these readings involved topics related to science, nature or technology as contrasted with other topics?

If they respond "none of the time" go to Section V. Otherwise, say the following:

**Please give an example of a topic related to science, nature or technology that someone has read to your child over the past year, or give the title of a book or magazine.*

8. Did your child request to have these materials read to them, or was it someone else's idea?

***If someone else's, ask** *What caused you/them to read these materials to your child?*

The next section concerns science activities in the home.

Section V: Science Activities in the Home

Children often engage in home activities that might encourage an interest in science, nature and technology. For example, some children who play with computers at home might become interested in how they work. Some children who play with or take care of animals might become interested in animal behavior. Also, some children who help with gardening or yard work might become interested in plant life. Finally, simple science experiments or careful observations done at home might result from reading books or watching television programs. In this section, I will ask about activities like these.

WORKING WITH COMPUTERS

1. Do you have a computer at home? (Y / N)

2. Does your child use a computer outside of school? (Y / N) ***If NO, go to question 6, If YES, ask the following question:***

   * *Where?*

3. Children often have a favorite activity on the computer. A favorite is one that they engage in repeatedly. Does your child have a favorite activity on the computer? (Y / N). ***If YES, ask the following question.***
   **What is your child's favorite activity on the computer?*

4. Roughly, how many hours per day, week, month, or year has your child used a computer?

5. Approximately, how many hours per day, week, month, or year has your child been engaged in computer activities related to science, nature, and technology? ***Unless they say NEVER, say the following***:

   ** Please give an example of such an activity.*

6. Has anyone outside of school ever discussed the way the computer's hardware or software works with your child? (Y / N) ***If NO, go to question 8. IF YES, say the following:***

   **Please give an example of this discussion:*

7. Who started these discussions?

   If not the child, ask the following 2 questions:

   **Who?*

   **What caused you them to start these discussions?*

WORKING ON THE INTERNET

8. Does your child have access to the Internet at home? (Y / N)

9. Does your child use the Internet? (Y / N) ***If NO, go to question 13. If YES, ask the following question:***

   **Where?*

10. Children often have a favorite activity on the Internet. A favorite is one that they engage in repeatedly. Does your child have a favorite activity on the Internet? (Y / N). ***If YES, ask the following question:***

    ** What is your child's favorite activity on the Internet?*

11. Roughly, how many hours per day, week, month, or year has your child used the Internet?

12. When your child was on the Internet, roughly how many hours was he or she engaged in activities related to science, nature, and technology?

13. Has any member of your household ever discussed the way the Internet works with your child? (Y / N) ***If YES, say the following:***

    **Please give an example of such a discussion*

14. Who started these discussions?

    ***If not the child, ask** *What caused you/someone else to start these discussions?*

NATURE-RELATED ACTIVITIES

15. Do you have a pet at home? (Y / N) ***If NO, go to question 18.***

16. In the past year, has your child helped in taking care of your pet? (Y / N) ***If YES, ask the following question:***

    **How many times per day, week, month, or year has your child helped in the care taking of your pet?*

17. Has the presence of your pet led to discussions about animals such that your child understands animal behavior better? For example, were there discussions of things like care taking, animal habits, or how animals are affected by changes in the environment? (Y / N) ***If YES, say:***

    **Please give an example of a discussion:*

18. Does your household have a garden or a house plant? (Y / N) ***If NO go to question 21.***

19. In the past year, has your child helped take care of the garden or house plant? (Y / N) ***If YES, ask the following question:***

    **How many times per day, week, month, or year has your child helped in the care of your garden or house plant?*

20. In the past year, has the presence of a garden or houseplant led to discussions about plants such that your child understands plant life better? For example, were there discussions of things like care taking, how plants grow, or how plants are affected by changes in the environment? (Y / N) ***If YES, say the following***

**Please give an example of a discussion:*

HOBBIES

21. Does your child have any hobbies? (Y / N) ***If NO, go to question 24.***

22. Children often have a favorite hobby. A favorite hobby is one that they engage in repeatly. Does your child have a favorite hobby? (Y / N) ***If YES, ask the following question:***

**What is your child's favorite hobby?*

23. Does your child have any hobbies related to science, nature or technology? Some examples of such hobbies are building models, bird watching, and astronomy. (Y / N) ***If YES, say the following:***

**Please list these hobbies:*

24. Does anyone in your household have a hobby or hobbies related to science, nature, or technology? (Y / N) ***If YES, say the following:***

**Please list these hobbies:*

TOYS

25. Children often have favorite toys. A favorite toy is one that they play with repeatedly. Does your child have a favorite toy? (Y / N) ***If YES, ask the following question:***

**What is your child's favorite toy?*

26. Has your child <u>received</u> toys or gifts that may encourage an interest in science, nature or technology? (Y / N) ***If NO, go to question 29. If YES, say the following:***

    ** Please list them:*

27. Has your child <u>played</u> with toys or gifts that may encourage and interest in science, nature or technology? (Y / N)

28. Did your child request any toys related to science, nature, or technology or was it someone else's idea? ***If someone else's idea, ask the following 2 questions:***

    ** Who's idea was it to give your child toys related to science, nature, or technology?*

    ** Why did they give such toys?*

<u>CAREFUL OBSERVATIONS OR SIMPLE EXPERIMENTS AT HOME</u>

Scientists often observe nature carefully or test ideas with experiments. Similar activities may occur in the home. This section is about these activities.

29. In the past year, did anyone in your household help your child conduct simple science experiments or engage in careful observations that were intended to help him or her understand the way the world works? (Y / N) ***If NO, go to section VI. If YES, say the following:***

    **Please give an example:*

30. How many <u>times</u> per day, week, month, or year, has someone conducted a simple experiment or engaged in careful observations with your child?

31. Did your child request this activity, or was it someone else's idea? ***If someone else's idea, ask the following 2 questions:***

    **Who's idea was it?*

    If not the child, ask **What caused you someone else to engage in these activities?*

Section VI: Community Activities

When children are not in school, they may visit places or engage in activities in the community.

1. Children often have favorite places and activities in the community. A favorite place is one they ask to visit repeatedly. A favorite activity is one they ask to engage in repeatedly. Does your child have a favorite place or activity in the community? ***If YES, ask the following question:***

   **What is it?*

2. Children may enjoy participating in a variety of activities outside of home? I will read a list of activities. Please rate your child's interest in each activity using the following scale:

   a. very interested
   b. somewhat interested
   c. neither interested or uninterested
   d. somewhat uninterested
   e. very uninterested

   How interested is your child in activities involving:

   -watching sporting events_____
   -entertainment, such as movies, amusement parks_____
   -participation in physical activities such as sports, swimming, skiing, hiking_____
   -educational events related to science, nature, and technology, such as the Space Science Centre_____
   -educational events not related to science, nature, and technology, including historical sites such as Fort Edmonton_____
   -playing with friends or by themself in the neighborhood

   Are there any activities that I may have missed? (Y / N) ***If YES, ask the following 2 questions:***
   **What are they?*

   ****For each activity, ask** How interested is your child in this activity?*

3. I am going to read a list of places or activities in the city of Edmonton. Please indicate whether your child has visited or attended any of these places or activities outside of school. If YES, please give a rough estimate of how many <u>times</u> he or she has visited these things per day, week, per month, per year, or per every few years, using the unit of time that is most convenient. Please keep in mind that we are interested in how often your child has visited or attended these things with your family, <u>not with his or her school</u>.

Has your child visited or attended: ***Remember to record # of times where applicable***

-science events or courses sponsored by John Jansen Nature Centre_____
-courses sponsored by the Space Sciences Centre_____
-exhibits at the Space Sciences Centre_____
-science presentations at the IMAX_____
-swimming classes, skiing courses, martial arts courses_____
-the Observatory at the Space Sciences Centre_____
-the Planetarium at the Space Sciences Centre_____
-Story Land Valley Zoo_____
-Muttart Conservatory_____
-movie theatres_____
-Devonian Gardens_____
-science courses sponsored by the Southwest Cultural Centre_____
-science exhibits at the Provincial Museum_____
-WEM attractions (waterpark, Galaxyland, etc.)_____
-science events or courses offered through the River Valley Outdoor Centre_____
-science-oriented camp programs offered by Parks and Recreation____
-clubs, such as Beavers or Sparks

Are there any activities related to science, nature, or technology your child may have attended or visited that I failed to mention? (Y / N) ***If YES, ask the following 2 questions:***

**What are they?*

**How many times has she or he visited these places in the past day, week, month, or years?*

4. On average, how many times per day, week, month, or year would you estimate that your child engaged in community activities related to science, nature, and technology?

5. Did your child ask to attend or visit places related to science, nature, or technology outside of home, or was it someone else's idea? ***If someone else's idea, ask the following 2 questions:***

**Who's idea was it?*

**What caused you or someone to visit or attend these places with your child?*

The next section is about questions that your child may ask about science, nature and technology.

Section VII: Answering Questions about Science or Technology

During discussions at home, questions about science, nature and technology may arise.

1. Consider all the questions that your child wanted you to answer in the past year. Roughly, how many of these questions would you estimate were related to science, nature and technology? Would you estimate that:

    a. most of their questions
    b. some of their questions
    c. their questions were rarely about these topics
    d. none of their questions were about these topics

    If none, go to Section VIII, otherwise say the following:

    **Please provide an example of a science-related question.*

2. Consider the following list of activities that may have concerned science, nature, or technology. For each activity, please indicate how many <u>times</u> per day, week, month, or year it inspired your child to ask questions about science, nature, or technology. Please keep in mind that one possible answer is that the activity never inspires your child to ask questions about science, nature or technology:

    How many times per day, week, month, or year did your child ask science-related questions because:

    -a member of the household was participating in activities or hobbies related to science, nature or technology, or was interested in a topic related to science, nature or technology__
    -they were reading a book on science, nature, or technology_____
    -they were watching a TV program on science, nature, or technology_____
    -they are using a computer_____
    -they are taking care of animals or a garden_____
    -they are attending a community activity or program concerning science, nature, or technology_____
    -they are watching a movie or video on science, nature, and technology_____
    -they are listening to a radio program on science, nature, and technology_____

Are there any activities that may have inspired your child questions about science, nature or technology that I have failed to mentionn (Y / N) ***If YES, ask the following 2 questions:***

**What are these activities?*

***For each activity, ask**: *How many times per day, week, month, or year did this activity inspire your child to ask questions about science, nature, and technology?*

3. Now, I will again present the list of activities that may have inspired some of your child's questions. Of all the times each activity occurs, please indicate how often it inspired your child to ask questions about science, nature, or technology using the following scale:

    a. each time this activity occurred
    b. most of the time this activity occurred
    c. some of the time this activity occurred
    d. this activity rarely inspired these questions
    e. this activity never inspired these questions

-a household member's participation in activities or hobbies related to science, nature or technology, or interest in a topic related to science, nature or technology_____
-reading a book_____
-watching a TV program_____
-using a computer_____
-taking care of animals or a garden_____
-attending a community activity or program_____
-watching a movie or video_____
-listening to a radio program_____

4. There are a variety of techniques parents may use to answer their child's questions about science, nature, or technology. Below is a list of possible techniques. Please use the following scale to indicate the how often you use each of the techniques described below:

    a. all of the time
    b. most of the time
    c. some of the time
    d. rarely
    e. none of the time

Of all the times you answer your child's question about science, nature, and technology, how often did you:

-answer based on information you already have_____
-consult an encyclopedia_____
-consult a science-related book on the topic_____
-view a movie or video on the topic_____
-ask someone who may know about the topic_____
-make a careful observation or conduct a simple experiment _____
-guess_____
-invent an answer that isn't true (for example, the stork delivers a baby)____

Are there any techniques that I have failed to mention? (Y / N) ***If YES, ask the following question:***

**What are they?*

5. How comfortable do you feel answering your child questions about science, nature and technology? Please use the following scale.

    a. very comfortable
    b. somewhat comfortable
    c. neither comfortable or uncomfortable
    d. somewhat uncomfortable
    e. very uncomfortable

Why did you answer as you did?

Now we will go on to section 8. The following questions will be repeated for each adult in your household. We recognize that many of these questions are of a sensitive nature. Please feel free to omit any questions you feel uncomfortable answering by saying that you prefer not to answer the question. Remember your responses are confidential.

Section VIII: About Your Household

1. How many people live in your household?

2. Approximately how old is each person?

3. What is the combined income level of your household?
   _____under $20,000
   _____$20,000-$30,000
   _____$30,000-$40,000
   _____$40,000-$50,000
   _____$50,000 or more
   _____ or do you prefer not to answer this question?

4. What is the highest level of education you have achieved?
   _____ No schooling
   _____ Elementary or secondary school ***Record highest grade completed***
   _____ College, university, or technical school ***Record number of years completed (e.g., ½ year, 1 year)***
   _____ or do you prefer not to answer this question?

   If they attended college, university, or a technical school, ask **What kind of educational institution have you attended?*

5. What degrees, certificates of diplomas have you obtained?

6. a) What kind of work do you do?
   (e.g., accounting clerk, sales representative, civil engineer, secondary school teacher, chief electrician, metal worker, homemaker.)

   b) Does your job involve any activity that is related to science, nature or technology? (Y / N) ***If YES, ask the following question****, Please give an example of an activity in your job that is related to science, nature, and technology?*

Repeat the following questions for each adult in the household. If there is no other adult, proceed to question 7.

2nd Adult in the household

4. What is the highest level of education they achieved?
_____ No schooling
_____ Elementary or secondary school ***Record highest grade completed***
_____ College, university, or technical school ***Record number of years completed (e.g., ½ year, 1 year)***
_____ or do you prefer not to answer this question?

If they attended college, university, or a technical school, ask **What kind of educational institution have you attended?*

5. What degrees, certificates of diplomas have they obtained?

6. a) What kind of work do they do?
(e.g., accounting clerk, sales representative, civil engineer, secondary school teacher, chief electrician, metal worker, homemaker.)

b) Does their job involve any activity that is related to science, nature or technology? (Y / N) ***If YES, ask the following question***, *Please give an example of an activity in their job that is related to science, nature, and technology?*

3rd Adult in the Household

4. What is the highest level of education they achieved?
_____ No schooling
_____ Elementary or secondary school ***Record highest grade completed***
_____ College, university, or technical school ***Record number of years completed (e.g., ½ year, 1 year)***
_____ do you prefer not to answer this question

If they attended college, university, or a technical school, ask **What kind of educational institution have you attended?*

5. What degrees, certificates of diplomas have they obtained?

6. a) What kind of work do they do?
(e.g., accounting clerk, sales representative, civil engineer, secondary school teacher, chief electrician, metal worker, homemaker.)

b) Does their job involve any activity that is related to science, nature or technology? (Y / N) ***If YES, ask the following question***, *Please give an example of an activity in their job that is related to science, nature, and technology?*

7. Do you have any friends or relatives in professions that are related to science, nature or technology? (Y / N) ***If YES, say*** **Please indicate their relationship to you and their profession:*

8. How much encouragement would you provide your child if they chose a career related to science, nature or technology as opposed to other careers? Please use the following scale.

a. complete encouragement
b. much encouragement
c. some encouragement
d. very little encouragement
e. no encouragement

9. Why did you respond in this way?

10. In general, how interested are you in science, nature, and technology?

a. very interested
b. somewhat interested
c. neither interested or uninterested
d. somewhat uninterested
e. very uninterested

Thank you for your cooperation.